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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/835,711	04/16/2001	Kia Silverbrook	360040-21	7729

7590 03/20/2003

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EXAMINER	
LIANG, LEONARD S	
ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/835,711	SILVERBROOK, KIA	
	Examiner	Art Unit	
	Leonard S Liang	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *138-145 and 147-154* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *138-145, 147-154* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim 138-143, 146-148, 150-154 rejected under 35 U.S.C. 103(a) as being unpatentable over Newman et al (US Pat 4899174) in view of Shepherd (US Pat 6255588).

Newman et al discloses:

- {claim 138} A power distribution arrangement (figure 1, reference 38; column 4, lines 1-11) for an elongate inkjet printhead (figure 1, reference 16, 18; column 1, lines 1-22) of a kind having a plurality of longitudinally spaced voltage supply points (figure 1, reference drawn in); interconnect means to connect respective selected pluralities of the voltage supply points to each of the bus bars

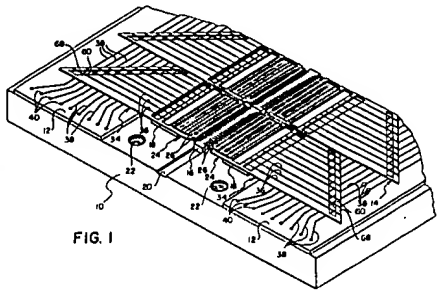


FIG. 1

- {claim 140} the interconnect means is in the form of a tape automated bonded film (column 2, lines 64-68)
- {claim 141} the TAB film connects by means of correspondingly sized noble metal deposited strips formed on the TAB film (column 4, lines 34-46)

- {claim 142} the interconnect means also includes a plurality of control lines for connection to selected others of the voltage supply points on the printhead (figure 1, reference 36, 38; column 4, lines 1-11)
- {claim 143} the interconnect means is in the form of one or more printed circuit boards, with wire bonds connecting the printed circuit boards to the printhead (figure 1, reference 12; column 1, lines 15-22; column 3, lines 39-43)
- {claims 147-148} the limitation "the printhead" does not add further limitation to the "power distribution arrangement"; the printhead is not part of the power distribution unit
- {claims 150 and 154} the limitation "the ink supply unit" does not add further limitation to the "power distribution arrangement"; the ink supply unit is not part of the power distribution unit
- {claim 151} the ink supply unit is detachable from the power supply and the external series of control lines (column 1, lines 10-22)
- {claim 153} the interconnect means includes a flexible portion that connects with the printhead (column 2, lines 64-68; TAB is inherently flexible)

Newman et al differs from the claimed invention in that it does not disclose:

- {claim 138} two or more elongate low resistance power supply bus bars, the bus bars, in use, being at relatively different potentials
- {claim 139} the bus bars are disposed to extend parallel to the printhead and the interconnect means to provide interconnections extending generally transversely therebetween
- {claim 141} the TAB film electrically connects with the bus bars by means of correspondingly sized noble metal deposited strips formed on the TAB film
- {claim 143} the interconnect means is in the form of one or more printed circuit boards which connect directly to the bus bars, with wire bonds connecting the printed circuit boards to the printhead
- {claim 146} the control line interconnect means are repeatedly connected with the power supply bus bars

- {claim 152} the bus bars comprise two mechanically stiff conductive rails

Shepherd discloses:

- {claim 138} two or more elongate low resistance power supply bus bars, the bus bars, in use, being at relatively different potentials (figure 7, reference 42, 44)

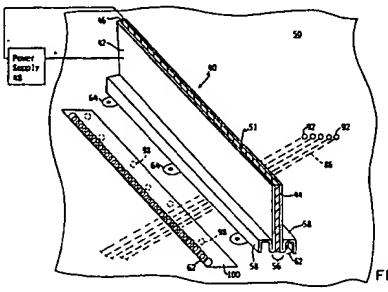


FIG. 7

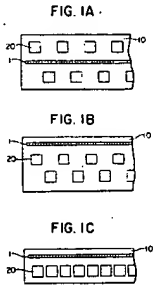
- {claim 152} the bus bars comprise two mechanically stiff conductive rails (column 2, lines 4-9)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the bus bars disclosed by Shepherd into the invention of Newman et al. The motivation for the skilled artisan in doing so is to gain the benefit of supplying power to a circuit board (column 1, lines 6-9). The combination naturally suggests that the bus bars are disposed to extend parallel to the printhead and the interconnect means to provide interconnections extending generally transversely therebetween; the TAB film electrically connects with the bus bars by means of correspondingly sized noble metal deposited strips formed on the TAB film; the interconnect means is in the form of one or more printed circuit boards which connect directly to the bus bars, with wire bonds connecting the printed circuit boards to the printhead; the control line interconnect means are repeatedly connected with the power supply bus bars.

2. Claim 144 is rejected under 35 U.S.C. 103(a) as being unpatentable over Newman et al (US Pat 4899174) in view of Shepherd (US Pat 6255588), as applied to claim 138 above, and further in view of Arai (US Pat 4506272).

Newman et al in view of Shepherd differs from the claimed invention in that it does not disclose that the interconnect means is configured so that it need only be connected to the printhead along one edge thereof.

Arai discloses, with respect to claim 144, that the interconnect means (semiconductor device) is connected to the printhead (heater array which integrally constitutes printhead; see column 1, lines 5-10) along one edge thereof (See figure 1B, references 10, 20; column 3, lines 7-27). It also teaches that figures 1A (interconnect means connect to printhead along two edges) and 1B (interconnect means connect to printhead along one edge) are alternative arrangements (See figures 1A and 1B, column 3, lines 7-12); thus they can be considered equivalent replacements.



It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Arai into the invention of Newman et al in view of Shepherd so that its interconnect means is configured so that it need only be connected to the printhead along one edge thereof. This would have been obvious because the interconnect means provides power from the bus bar to the printhead regardless of whether it is connected to the printhead along one edge or two thereof; the connecting along one edge and the connecting along two edges can therefore be considered equivalent.

3. Claim 145 is rejected under 35 U.S.C. 103(a) as being unpatentable over Newman et al (US Pat 4899174) in view of Shepherd (US Pat 6255588), as applied to claim 140 above, and further in view of Meyer (US Pat 5612511).

Newman et al in view of Shepherd discloses, with respect to claim 145, a two-layer TAB film.

Newman et al in view of Shepherd differs from the claimed invention in that it does not disclose a double-sided TAB film.

Meyer discloses, with respect to claim 145, a double-sided electrical interconnect flexible circuit (See abstract; column 2, lines 28-30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Meyer into the invention of Newman by replacing the two-layer TAB film with a double-sided TAB film. The motivation for the skilled artisan in doing so is to gain the benefit of cutting costs. Meyer teaches that making double-sided interconnect flexible circuits is cheaper than making two-layer flex circuits (See column 2, lines 16-23).

4. Claim 149 is rejected under 35 U.S.C. 103(a) as being unpatentable over Newman et al (US Pat 4899174) in view of Shepherd (US Pat 6255588), as applied to claim 142 above, and further in view of Hanson (US Pat 4635073).

Newman et al in view of Shepherd differs from the claimed invention in that it does not disclose that the low resistance bus bars and flexible interconnect means are packaged with an associated ink supply unit for delivering ink to ink supply passages formed in the printhead.

Hanson discloses, with respect to claim 149, a flexible interconnect means packaged with an associated ink supply unit for delivering ink to ink supply passages formed in the printhead (column 2, lines 53-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Hanson into the invention of Newman et al in view of Shepherd so that the flexible interconnect means is packaged with an associated ink supply unit for delivering ink to ink supply passages formed in the printhead. The motivation for the skilled artisan in doing so is to gain the benefit of producing an improved thermal ink jet print head assembly which provides a reduction in the overall cost of the thermal ink jet printer head assembly being fabricated (column 1, lines 40-46).

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Silverbrook (US Pat 5815173) discloses a ZBJ printhead chip (See figure 20, reference 100; column 19, lines 13-42), as well as an ink supply unit (See figure 20, references 210-214).

White (US Pat 5494698) teaches that thermal ink jet printheads are an example of MEMS produced technology.

Firl (US Pat 4989317) discloses a method for making TAB circuit electrical connector supporting multiple components thereon.

Childers (US Pat 5471163) discloses TAB circuit fusible links for disconnection or encoding information.

Tran (US Pat 6244696) discloses an inkjet print cartridge design for decreasing ink shorts by using an elevated substrate support surface to increase adhesive sealing of the printhead from ink penetration.

Response to Arguments

6. Applicant's arguments filed on 12/23/02 have been fully considered but they are not persuasive.

The applicant asserts that Newman et al is not a proper reference since it relates to LED-type printers, and not inkjet printers. However, the **claimed** invention is a **power distribution arrangement**, which is disclosed by Newman et al. Furthermore, Newman teaches that "The thermal printhead...is more closely analogous to the LED printhead to which the present invention is directed (column 2, lines 29-31), which implies that LED printheads are closely related to thermal printheads when considering power distribution arrangements. The applicant makes many points that it would not be obvious to combine LED printheads with inkjet printheads, but as shown here, both LED printheads and inkjet printheads are taught to have similar power distribution arrangements, which is the claimed invention.

The applicant further asserts that Hanson does not disclose power supply bars with a potential difference between them. The examiner submits that the power supply bars disclosed by Hanso, though both grounding bars, can be considered power supply bus bars since they play a role in power supply (grounding is necessary for power supply). However, the examiner admits that agrees that Hanson does not disclose the bus bars to be at different potentials. In light of this new limitation, a new rejection was formed, as shown in the above rejection.

The applicant submits "Shepherd is concerned with the supplying power to a relatively large-scale circuit board...in such a case, noise reduction might well be a driving factor in selection of a bus bar arrangement. However, such requirements are not necessarily analogous with printhead design..." It is well known however that no practical device can obtain perfect

noise reduction, thus it is still a valid motivation to reduce noise, even in a printhead that might already be relatively immune to noise; improvement on the status quo is always a possible motivation. Furthermore, this argument is rendered moot in light of the new motivation given above.

The applicant asserts that noble metal strips are disclosed and "in any event, it is clear from figure 1 that this border is removed from the TAB construction before assembly to form the print head and cannot, therefore, be considered as relevant to any prospective bus bar connection." However, this is not true. Newman discloses noble metal strips formed directly on the TAB. Though the printhead is removable from the TAB frame, that does not alter the fact that when the printhead is connected to the TAB frame, there is disclosed a power distribution arrangement where the use of bus bars to provide power would be obvious, thus naturally suggesting the connection of the existing noble metal strips to the bus bars.

The applicant asserts "Regarding Meyer, Examiner suggests that it would have been obvious to replace the TAB film in Newman with double sided TAB film to reduce costs. However, Examiner has not appreciated that there is more to the use of double sided film than mere cost." This argument is irrelevant. It is well known to one of ordinary skill in the art that reducing cost is always a valid motivation. In order to combine art, it is only necessary to produce a valid motivation, not necessarily the same motivation as used by applicant.

For claims 147-148, the applicant submits "that adding limitations is appropriate in the present circumstances because it implicitly adds limitations to the power distribution arrangement." The applicant does not clearly state what implicit limitations are added, and thus, the examiner maintains the original rejection. It is the view of the examiner that how a printhead is formed and used does not relate to the power distribution arrangement used to drive it.

Similarly, for claims 150 and 154, the examiner maintains that the ink supply does not add further limitation to the power distribution arrangement as claimed. However, in terms of claim 151, the examiner does agree that the ink supply unit being detachable from the power supply does implicitly limit the power distribution arrangement, and thus a new rejection has been made, as shown above.

All other arguments are rendered moot in view of the new rejection.

Final Rejection

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard S Liang whose telephone number is (703) 305-4754. The examiner can normally be reached on 8:30-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703) 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

lsl LSL

March 17, 2003

John Barlow
Supervisory Patent Examiner
Technology Center 2800